B5

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/923,709	08/07/2001	Rachel E. Learned	D-4544	1572

7590 04/05/2004

Robert K. Tendler
65 Atlantic Avenue
Boston, MA 02110

EXAMINER	
AMINZAY, SHAIMA Q	

ART UNIT	PAPER NUMBER
2684	4

DATE MAILED: 04/05/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/923,709	LEARNED ET AL.	
	Examiner	Art Unit	
	Shaima Q. Aminzay	2684	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 January 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-17* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *15-17* is/are allowed.

6)☒ Claim(s) *1,2,6-8 and 12* is/are rejected.

7)☒ Claim(s) *3-5,9 and 10* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date 3.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Detailed Action

1. This is the first action, application filed on 09/07/2001.
2. Independent Claims 1, 12, 15, 16, 17, and dependent claims 2, 6, 7, and 8 are pending in the case.
3. Claims 3, 4, 5, 9, and 10 are objected.
4. Claims 11, 13, and 14 are allowed.
5. The present title of the application is "Method for overusing frequencies to permit simultaneous transmission of signals from two or more users on the same frequency and time slot"

NONE FINAL ACTION

Claim Rejections – 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) Patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 1, 2, 6-8, 12, and 15-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dent U. S. Patent Number 5790606, in view of Wales et al. U. S. Patent Number 6122269.

8. Regarding claims 1, and 12, Dent teaches the number of users capable of communicating over a wireless network (column 2, lines 39-40, and Figure 1;

column 1, lines 1-17), and transmitting information in a digital format from multiple separate wireless transmitters on the same frequency (column 2, lines 39-44, and column 3, lines 39-49), and using Viterbi decoding for signal estimation (see for example, column 6, lines 18-22), and "tail bits" method to reduce the search time (see for example, column 8, lines 14-16, lines 44-67, column 9, lines 1-4).

However, Dent does not teach separating the transmitted signals which arrive corrupted a receiver as a corrupted received signal so as to remove the interference of one signal from that of another using an exhaustive search, whereby multiple simultaneously transmitted signals may be recovered without requiring new waveforms or new frequency slots or time slots.

Wales teaches separating the transmitted signals from another transmitted signal by using the Viterbi method and recovering the transmitted signal (column 5, lines 43-67).

It would have been obvious to one of ordinary skill in the art at the time invention was made to combine Wales' Viterbi signal recovery process with Dent's multiple access wireless communication system to provide a multiple access wireless communication system that detects and recovers the corrupted transmitted signal (Wales, column 1, lines 6-67).

9. Regarding claims 15, 16, and 17, Dent teaches the number of users capable of communicating over a wireless network with a cell site (column 2, lines 39-40, and Figure 1; column 1, lines 1-17), providing that multiple users transmit on the

same frequency at the same time (column 2, lines 39-44, and column 3, lines 39-49); and using Viterbi decoding for signal estimation (see for example, column 6, lines 18-22).

However, Dent does not teach using an exhaustive search type multi-user detector to separate out the resulting interfering signals received at the satellite.

Wales teaches separating the transmitted signals from another transmitted signal by using the Viterbi method and recovering the transmitted signal received at the satellite (see for example, Figure 1, column 3, lines 5-15; column 5, lines 43-67).

It would have been obvious to one of ordinary skill in the art at the time invention was made to combine Wales Viterbi signal recovery process with Dent's multiple access wireless communication system to provide a multiple access wireless communication system that detects and recovers the corrupted transmitted signal (Wales, column 1, lines 6-67).

10. Regarding claim 2, 6, 7 and 8, Dent and Wales teaches claim 1, and further Dent teaches the use of a filter providing initial point parameter for separating the interfering signals (column 3, lines 33-36), and the received signal is received in the absence of other user interference over an acquisition channel prior to assignment to a traffic channel (column 3, lines 45-49), and estimating and measuring power, phase, baud timing offset and frequency offset of the individual received signals corresponding to each of the transmitted signals that comprise the corrupted received signal (see for example, column6, lines 48-57).

Allowable Subject Matter

11. Claims 11, 13, and 14 are allowed.

Reasons for Allowance

12. The following is an examiner's statement of reason for allowance:

The prior art specifically Dent and Wales, failed to render obviousness in combination or individually and failed to anticipate individually the following underlined limitations:

"In a digital wireless communications network, a system for reducing the computational complexity of multi-user detection using a Viterbi detection algorithm so as to permit the system to separate multiple signals transmitted at the same frequency and thus permit signal packing, comprising: a receiver for receiving multiple digital signals transmitted on the same frequency, said receiver having a multi-user detector for implementing an exhaustive search strategy for separating the simultaneously arriving signals; a power responsive grouping unit for separating signals received at said receiver into groups, said multi-user detector first processing the group having the highest power, thus to reduce processing complexity by processing only one group at a time; and, a reduced state Viterbi decoder which removes from consideration a predetermined number of intersymbol interference tails, thus to minimize the complexity, whereby signal separation for a number of simultaneously transmitted signals at the same frequency may be accomplished by the megaflop processors available for

wireless handsets" as disclosed in claim 11.

"A method for reducing the computational complexity of separating two digital signals that exist simultaneously on the same communication channel, comprising the step of: using parameter estimation and a Viterbi decoder to perform an exhaustive search algorithm to separate the bit streams corresponding to all the signals in the channel, the signals being separated into groups by received power, with the signals in the highest power group being processed first, thereby to limit computational complexity by doing an exhaustive search only on one group of signals at a time" as disclosed in claim 13. (These limitations, or similar language, appear in each of the independent claims.) These limitations, in combination with the other limitations recited in the independent claims are not anticipated or suggested by the prior art.

Objection

13. Claims 3,4, 5, 9, and 10 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

14. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure

15. Sugita, Method and system for demodulating a receive signal including a pilot signal.

Inquiry

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shaima Q. Aminzay whose telephone number is 703-305-8723. The examiner can normally be reached on 7:00 AM -5:00 PM. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nay Maung can be reached on 703-308-7745. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9314. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the TC 2600's customer service telephone number is 703-305-3900.

NAY MAUNG
SUPERVISORY PATENT EXAMINER

Shaima Q. Aminzay
Shaima Q. Aminzay
(Examiner)

Nay Maung
(SPE)
Art Unit 2684

March 24, 2004